

REPLY



To: Examiner of the Patent Office

1. Identification of the International Application

PCT/JP03/13074

2. Applicant

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Chiyoda-ku, Tokyo 100-0005 Japan

4. Date of Notification: 03.08.2004

5. Subject Matter of Reply:

This is a reply to the first Written Opinion mailed August 3,  
2004.

The Applicant has amended Claims 1 and 2 with the Amendment  
separately filed.

According to the present invention, in order to prevent variance

in conductivity and resistivity of a substrate when an unpurified metallurgical grade (metal grade) silicon containing B or P in an amount of approximately tens of ppmw is used as a material, B or Al of an amount which does not lower the crystallinity is added to produce a substrate having resistivity of  $300 \Omega \cdot \text{cm}$  or less. A characteristic of the present invention is that a large quantity of B or Al, which is not affected by an amount of P or B contained in a material, is added into a melt.

D1 discloses that plate-shaped metal-grade silicon contains B or Al. However, D1 does not have the description that a predetermined amount of B or Al is intentionally added into molten metal-grade silicon.

D2 discloses that B or Al is added to molten silicon and directional solidification is performed. However, the melt is a melt of electronic grade silicon, not a melt of metal grade silicon as used in the present invention.

## AMENDMENT

(Amendment based upon the provision of Article 11 of said Law)

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4. Item to be amended: Claims

5. Subject Matter of Amendment

Claims 1 and 2 have been changed their category from "a polycrystalline silicon substrate for a solar cell" to --a method of producing a polycrystalline silicon substrate for a solar cell--.

**6. List of Attached Document**

**1) A replacement sheet of page 42**

## CLAIMS

1. (Amended) A method of producing a polycrystalline silicon substrate for a solar cell, comprising the steps of:

5 performing one-direction solidification on a melt prepared by melting metallurgical grade silicon to form a polycrystalline silicon ingot;

slicing the polycrystalline silicon ingot to obtain a base; and

10 growing a high purity polycrystalline silicon layer on a surface of the base,

wherein the melt is prepared by adding B to molten metallurgical grade silicon at an amount of  $2 \times 10^{18} \text{ cm}^{-3}$  to  $5 \times 10^{19} \text{ cm}^{-3}$  based on a concentration.

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2. (Amended) A method of producing a polycrystalline silicon substrate for a solar cell, comprising the steps of:

performing one-direction solidification on a  
20 melt prepared by melting metallurgical grade silicon to form a polycrystalline silicon ingot;

slicing the polycrystalline silicon ingot to obtain a base; and

growing a high purity polycrystalline silicon  
25 layer on a surface of the base,

wherein the melt is prepared by adding Al to molten metallurgical grade silicon at an amount of  $1 \times 10^{19} \text{ cm}^{-3}$  to  $1 \times 10^{21} \text{ cm}^{-3}$  based on a concentration.